

REMARKS/ARGUMENTS

The Office Action mailed on September 26, 2003 rejected claims 36-39 as anticipated by Little (5,119,408) as well as McCroskey et al. (5,023,895). Also, claims 1-40 were rejected as unpatentable over Hultgren (6,217,334) and McCroskey et al..

Applicants respectfully traverse the Section 102 and 103 rejections and submit that all claims are in condition for allowance.

The Section 102 Rejection

Claims 36-39 were rejected as anticipated by Little. These claims have been canceled to place the case in condition for allowance. Applicants reserve the right to re-present the canceled claims in a continuation application.

The Section 103 Rejection

The Office Action rejected claims 1-40 as follows:

"Hultgren discloses a method of creating a digital model of a patient's teeth from an impression taken thereof. Hultgren discloses the invention except that the impression is scanned using a laser scanner rather than an x-ray source. McCroskey et al. et al. disclose that an x-ray scanner is an equivalent structure known in the art to create three-dimensional digital images of objects. Therefore, because these two scanners were art-recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute an x-ray scanner for the laser scanner used by Hultgren."

Hultgren discloses a dental and soft tissue scanning method and system which uses fast laser line scanning techniques of negative image impressions. As noted at Col. 5, lines 15-28:

Next at block 35, the scan of the impression occurs. In the preferred embodiment, a scanner manufactured by Laser Design Inc. of Minneapolis, Minn. designated as model number 8849648 may be used. The operation and scanning methodology used by this type of scanner is generally described in U.S. Pat. No. 5,124,524 (which is hereby incorporated herein by reference). Generally, the scanner model number 884648 manufactured by Laser Design is referred to as a line scanner device. It will be appreciated that for a complete study cast of the upper and lower teeth, two scans of the

negative image impressions occur (i.e., one lower and one upper). Further, in order to properly reference the two sets of teeth together, a scan of the bite tray 300 impression also takes place.

Claims 1-7 have been canceled to place the case in condition for allowance. As to independent claim 8, neither Hultgren nor McCroskey et al. shows a method to create a digital model of a patient's teeth by: creating an impression of the patient's teeth; scanning the impression using an X-ray source; and generating the digital model with scanned data, wherein an upper teeth impression, a lower teeth impression and a bite impression are scanned together.

Hultgren and McCroskey et al. do not render claim 8 obvious as discussed above. Additionally, neither Hultgren nor McCroskey et al. shows that an upper teeth impression, a lower teeth impression and a bite impression are scanned together. In fact, Hultgren points out as it noted that "It will be appreciated that for a complete study cast of the upper and lower teeth, two scans of the negative image impressions occur (i.e., one lower and one upper). Further, in order to properly reference the two sets of teeth together, a scan of the bite tray 300 impression also takes place." Hultgren at Col. 5, lines 23-28.

In sum, independent claim 8 is patentable over Hultgren and McCroskey et al.. The dependent claims are also patentable over the cited references. For example, neither Hultgren or McCroskey et al. shows (claim 8) digitally reversing data from the upper and lower impression scan data to make positive data, (claim 9) the digital reversing identifies inner surfaces of an impression material and extracting the inner surfaces using a largest connected component algorithm, (claim 11) aligning data into a bite position using the bite material scanned, (claim 12) digitally detailing the teeth data, (claim 13) setting a final bite, (claim 14) articulating the digital model, (claim 15) treating a patient using the digital model (claim 16) generating a computer representation of a masticatory system of the patient; and determining an occlusion from the computer representation of the masticatory system, (claim 17) wherein the occlusion is a static occlusion, further comprising: modeling an ideal set of teeth; automatically applying the ideal set of teeth to the computer representation of a masticatory system of the

patient; and optimizing the position of the patient's teeth to fit the ideal set of teeth, (claim 18) the modeling step further comprises selecting one or more arch forms specifying the ideal set of teeth, (claim 19) the masticatory system includes jaws and wherein the applying step includes: registering a model of the upper and lower teeth with a model of the masticatory system; simulating the motion of the jaws to generate contact data between the upper and lower teeth; and placing a tooth in a final position based on the contact data, (claim 20) the model is registered using X-ray data, (claim 21) the model is registered using computed tomography data, (claim 22) the model is registered using data associated with a mechanical model, (claim 23) the simulating step further comprises applying kinematics to the model of the teeth, (claim 24) the simulating step further comprises applying a constrained motion to the model of the tooth, (claim 25) the placing step is based on a measure of undesirability to the contacts, (claim 26) optimizing the position of the tooth according to the measure of undesirability, (claim 27) minimizing the measure of undesirability, (claim 28) the measure of undesirability is a function of one or more of Peer Assessment Rating (PAR) metrics, distance-based metrics and shape-based metrics, (claim 29) the simulating step includes providing a library of motions, (claim 30-32) the library of motions includes a protrusive motion, a lateral motion or tooth-guided motions, (claims 33) applying physical forces to one jaw, (claim 34) placing step further includes updating the computer representation of the masticatory system with new patient data, and (claim 35) wherein the patient has a first teeth model, further comprising: scanning the teeth of the patient to generate a second teeth model; matching the second teeth model with the first teeth model; applying a final position transform to the second teeth model; and adjusting the position of teeth in the second model based on new information.

Applicant notes that the present rejection does not establish *prima facie* obviousness under 35 U.S.C. § 103 and M.P.E.P. §§ 2142-2143. The Examiner bears the initial burden to establish and support *prima facie* obviousness. *In re Rinehart*, 189 U.S.P.Q. 143 (CCPA 1976). To establish *prima facie* obviousness, three basic criteria must be met. M.P.E.P. § 2142. First, the Examiner must show some suggestion or motivation, either in the Hultgren et al. reference or in the knowledge generally available to one of ordinary skill in the art, to modify

the reference so as to produce the claimed invention. M.P.E.P. § 2143.01; *In re Fine*, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988). Secondly, the Examiner must establish that there is a reasonable expectation of success for the modification. M.P.E.P. § 2142. Thirdly, the Examiner must establish that the prior art references teach or suggest all the claim limitations. M.P.E.P. §2143.03; *In re Royka*, 180 U.S.P.Q. 580 (CCPA 1974). The teachings, suggestions, and reasonable expectations of success must be found in the prior art, rather than in Applicant's disclosure. *In re Vaeck*, 20 U.S.P.Q.2d 1438 (CAFC 1991). Applicant respectfully submits that a *prima facie* case of obviousness has not been met because the Examiner's rejection fails on at least two of the above requirements.

First, Applicant notes that the Hultgren et al. reference fails to teach or suggest all the claim limitations of independent claims as discussed above. These limitations are not reasonably taught or suggested in the cited art reference. Secondly, Applicant notes that no motivation or suggestion, either in the cited art reference or in the knowledge generally available to one of ordinary skill in the art, has been cited by the Examiner to modify the Hultgren et al. reference so as to produce the claimed invention. As noted above, the Hultgren et al. reference fails to teach or suggest using X-ray sources to image dental impressions or models. In fact, the Hultgren et al. reference teaches away from Applicant's invention as one skilled in the art would have been generally discouraged from applying X-ray to solve problem since Hultgren states that laser scanning is advantageous in providing "a cost effective, relatively fast, and efficient system and method for electronically scanning dental surfaces or dental materials such that the resulting data may be manipulated for a wide variety of dental and/or medical purposes and uses." Hultgren cited an impressive list of prior art to solve the problem, and X-ray type of scanner was not contemplated by Hultgren.

Applicant points out that the Examiner bears the initial burden of factually establishing and supporting any *prima facie* conclusion of obviousness. *In re Rinehart*, 189 U.S.P.Q. 143 (CCPA 1976); M.P.E.P. § 2142. If the Examiner does not produce a *prima facie* case, the Applicant is under no obligation to submit evidence of nonobviousness. *Id.* In the

instant case, the Examiner has not pointed to any evidence in Hultgren et al., or how knowledge of those skilled in the art, provide a suggestion or motivation to modify the reference teaching so as to produce the claimed invention. See *In re Zurko*, 59 U.S.P.Q.2d 1693 (Fed. Cir. 2001) ([I]n a determination of patentability the Board cannot simply reach conclusions based on its understanding or experience - or on its assessment of what would be basic knowledge or common sense. Rather, the Board must point to some concrete evidence in the record in support of these findings).

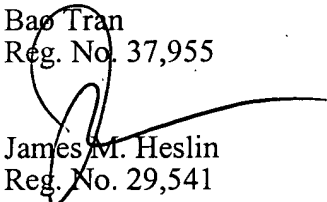
Under Vaeck, absent any evidence of a cited suggestion or reasonable motivation in the Hultgren et al. reference, or knowledge of those skilled in the art, for applying X-ray sources to generate dental models, *prima facie* obviousness of independent claims 1, 8 and 36 has not been established. As such, it is respectfully requested that the § 103(a) rejection of independent claims be withdrawn and the claims be allowed.

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance and an action to that end is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 650-326-2400.

Respectfully submitted,

Bao Tran
Reg. No. 37,955

By:  James M. Heslin
Reg. No. 29,541

TOWNSEND and TOWNSEND and CREW LLP
Two Embarcadero Center, Eighth Floor
San Francisco, California 94111-3834
Tel: 650-326-2400
Fax: 415-576-0300
Attachments
JMH:jke
60188130 v1